

## Claims

- 1.(currently amended) Low expansion transparent glass-ceramics obtained by heat treating a base glass containing 3 - 15% ZnO in mass % based on the total amount of oxides present and which is produced at a melting temperature of 1530°C or below, said glass-ceramics containing  $\beta$ -quartz or  $\beta$ -quartz solid solution as a predominant crystal phase and 50% - 60% SiO<sub>2</sub> in mass % on the basis of amount of total oxides, being free of K<sub>2</sub>O and Na<sub>2</sub>O, having an average linear thermal expansion coefficient ( $\alpha$ ) within a range from  $+6 \times 10^{-7}/^{\circ}\text{C}$  to  $+35 \times 10^{-7}/^{\circ}\text{C}$  within a temperature range from 100°C to 300°C and having 80% transmittance wavelength (T<sub>80</sub>) of 700nm or below.
2. (original) Low expansion transparent glass-ceramics as defined in claim 1 wherein internal transmittance for a plate having thickness of 10mm is 75% or over at light wavelength of 1550nm.
3. (original) Low expansion transparent glass-ceramics as defined in claim 1 having a heat resisting temperature of 800°C or over.
4. (original) Low expansion transparent glass-ceramics as defined in claim 1 having Young's modulus of 90 GPa or over.
5. (original) Low expansion transparent glass-ceramics as defined in claim 1 containing 1.5% - 3.5% Li<sub>2</sub>O in mass % on the basis of amount of total oxides.
6. (original) Low expansion transparent glass-ceramics as defined in claim 1 wherein amount of eluting lithium ion is less than 0.0050 $\mu\text{g}/\text{cm}^2$ .
7. (original) Low expansion transparent glass-ceramics as defined in claim 1 containing 3% - 6% TiO<sub>2</sub> in mass % on the basis of amount of total oxides.
8. (original) Low expansion transparent glass-ceramics as defined in claim 1 containing three or more ingredients among RO ingredients (where R is Mg, Ca, Sr, Ba or Zn) in an amount of 0.5% or over in mass % on the basis of amount of total oxides for respective ingredients.

9. (original) Low expansion transparent glass-ceramics as defined in claim 8 containing ZnO in a larger amount than other RO ingredients in mass % on the basis of amount of total oxides.

10. (original) Low expansion transparent glass-ceramics as defined in claim 8 containing a total amount of the RO ingredients of 3.5% or over in mass % on the basis of amount of total oxides.

11. (original) Low expansion transparent glass-ceramics as defined in claim 1 containing a total amount of R'O ingredients (where R' is Mg, Ca, Ba or Sr) of 3% - 13% in mass % on the basis of amount of total oxides.

12. (currently amended) Low expansion transparent glass-ceramics as defined in claim 1 comprising in mass % on the basis of amount of total oxides:

Al <sub>2</sub> O <sub>3</sub>	20 - 30%
MgO	0.5 - 2%
CaO	0.5 - 2%
SrO	0 - 10%
BaO	1 - 5%
ZnO	<del>0.5</del> <u>3</u> - 15%
Li <sub>2</sub> O	1.5 - 3.5%
TiO <sub>2</sub>	3 - 6%
ZrO <sub>2</sub>	1 - 5%
Nb <sub>2</sub> O <sub>5</sub>	0 - 5%
La <sub>2</sub> O <sub>3</sub>	0 - 5%
Y <sub>2</sub> O <sub>3</sub>	0 - 5%
As <sub>2</sub> O <sub>3</sub> and/or Sb <sub>2</sub> O <sub>3</sub>	0 - 2%.

13. (withdrawn) Low expansion transparent glass-ceramics obtained by heat treating a base glass produced at a melting temperature of 1530° or below, said glass-ceramics containing β-quartz or β-quartz solid solution as a predominant crystal phase and 50% - 60% SiO<sub>2</sub> in mass % on the basis of amount of total oxides and 1% - 5% BaO in mass % on the basis of amount of total oxides, having an average linear thermal expansion coefficient (α) within a range

from  $+6 \times 10^{-7}/^{\circ}\text{C}$  to  $+35 \times 10^{-7}/^{\circ}\text{C}$  within a temperature range from  $100^{\circ}\text{C}$  to  $300^{\circ}\text{C}$  and having 80% transmittance wavelength ( $T_{80}$ ) of 700nm or below.

14.(withdrawn) Low expansion transparent glass-ceramics as defined in claim 13 wherein internal transmittance for a plate having thickness of 10mm is 75% or over at light wavelength of 1550nm.

15.(withdrawn) Low expansion transparent glass-ceramics as defined in claim 13 having a heat resisting temperature of  $800^{\circ}\text{C}$  or over.

16. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 13 having Young's modulus of 90 GPa or over.

17. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 13 containing 1.5% - 3.5%  $\text{Li}_2\text{O}$  in mass % on the basis of amount of total oxides.

18.(withdrawn) Low expansion transparent glass-ceramics as defined in claim 13 wherein amount of eluting lithium ion is less than  $0.0050\mu\text{g}/\text{cm}^2$ .

19.(withdrawn) Low expansion transparent glass-ceramics as defined in claim 13 containing 3% - 6%  $\text{TiO}_2$  in mass % on the basis of amount of total oxides.

20.(withdrawn) Low expansion transparent glass-ceramics as defined in claim 13 containing three or more ingredients among RO ingredients (where R is Mg, Ca, Sr, Ba or Zn) in an amount of 0.5% or over in mass % on the basis of amount of total oxides for respective ingredients.

21.(withdrawn) Low expansion transparent glass-ceramics as defined in claim 20 containing ZnO in a larger amount than other RO ingredients in mass % on the basis of amount of total oxides.

22. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 20 containing a total amount of the RO ingredients of 3.5% or over in mass % on the basis of amount of total oxides.

23.(withdrawn) Low expansion transparent glass-ceramics as defined in claim 13 containing a total amount of R'O ingredients (where R' is Mg, Ca, Ba or Sr) of 3% - 13% in mass % on the basis of amount of total oxides.

24. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 13 comprising in mass % on the basis of amount of total oxides:

Al <sub>2</sub> O <sub>3</sub>	20 - 30%
MgO	0.5 - 2%
CaO	0.5 - 2%
SrO	0 - 10%
ZnO	0.5 - 15%
Li <sub>2</sub> O	1.5 - 3.5%
TiO <sub>2</sub>	3 - 6%
ZrO <sub>2</sub>	1 - 5%
Nb <sub>2</sub> O <sub>5</sub>	0 - 5%
La <sub>2</sub> O <sub>3</sub>	0 - 5%
Y <sub>2</sub> O <sub>3</sub>	0 - 5%
As <sub>2</sub> O <sub>3</sub> and/or Sb <sub>2</sub> O <sub>3</sub>	0 - 2%.

25.(currently amended) Low expansion transparent glass-ceramics obtained by heat treating a base glass containing 3% - 15% ZnO in mass % based on the total amount of oxides present and which is produced at a melting temperature of 1530°C or below, said glass-ceramics containing 50% - 60% SiO<sub>2</sub> in mass % on the basis of amount of total oxides and 1.5% - 3.5% Li<sub>2</sub>O on the basis of amount of total oxides, being free of K<sub>2</sub>O and Na<sub>2</sub>O, having an average linear thermal expansion coefficient ( $\alpha$ ) within a range from  $+6 \times 10^{-7}/^{\circ}\text{C}$  to  $+35 \times 10^{-7}/^{\circ}\text{C}$  within a temperature range from 100°C to 300°C and having 80% transmittance wavelength ( $T_{80}$ ) of 700nm or below.

26. (original) Low expansion transparent glass-ceramics as defined in claim 25 wherein internal transmittance for a plate having thickness of 10mm is 75% or over at light wavelength of 1550nm.

27. (original) Low expansion transparent glass-ceramics as defined in claim 25 having a heat resisting temperature of 800°C or over.

28. (original) Low expansion transparent glass-ceramics as defined in claim 25 having Young's modulus of 90 GPa or over.

29. (original) Low expansion transparent glass-ceramics as defined in claim 25 wherein amount of eluting lithium ion is less than 0.0050 $\mu\text{g}/\text{cm}^2$ .

30. (original) Low expansion transparent glass-ceramics as defined in claim 25 containing 3% - 6%  $\text{TiO}_2$  in mass % on the basis of amount of total oxides.

31. (original) Low expansion transparent glass-ceramics as defined in claim 25 containing three or more ingredients among RO ingredients (where R is Mg, Ca, Sr, Ba or Zn) in an amount of 0.5% or over in mass % on the basis of amount of total oxides for respective ingredients.

32.(original) Low expansion transparent glass-ceramics as defined in claim 31 containing ZnO in a larger amount than other RO ingredients in mass % on the basis of amount of total oxides.

33. (original) Low expansion transparent glass-ceramics as defined in claim 31 containing a total amount of the RO ingredients of 3.5% or over in mass % on the basis of amount of total oxides.

34.(original) Low expansion transparent glass-ceramics as defined in claim 25 containing a total amount of R' ingredients (where R' is Mg, Ca, Ba or Sr) of 3% - 13% in mass % on the basis of amount of total oxides.

35. (currently amended) Low expansion transparent glass-ceramics as defined in claim 25 comprising in mass % on the basis of amount of total oxides:

$\text{Al}_2\text{O}_3$	20 - 30%
MgO	0.5 - 2%
CaO	0.5 - 2%

SrO	0 - 10%
BaO	1 - 5%
ZnO	<del>0.5</del> <u>3</u> - 15%
TiO <sub>2</sub>	3 - 6%
ZrO <sub>2</sub>	1 - 5%
Nb <sub>2</sub> O <sub>5</sub>	0 - 5%
La <sub>2</sub> O <sub>3</sub>	0 - 5%
Y <sub>2</sub> O <sub>3</sub>	0 - 5%
As <sub>2</sub> O <sub>3</sub> and/or Sb <sub>2</sub> O <sub>3</sub>	0 - 2%.

36. (withdrawn) Low expansion transparent glass-ceramics obtained by heat treating a base glass produced at a melting temperature of 1530°C or below, said glass-ceramics containing 50% - 60% SiO<sub>2</sub> in mass % on the basis of amount of total oxides, 1.5% - 3.5% Li<sub>2</sub>O on the basis of amount of total oxides and 1% - 5% BaO in mass % on the basis of amount of total oxides, having an average linear thermal expansion coefficient ( $\alpha$ ) within a range from  $+6 \times 10^{-7}/^{\circ}\text{C}$  to  $+35 \times 10^{-7}/^{\circ}\text{C}$  within a temperature range from 100°C to 300°C and having 80% transmittance wavelength ( $T_{80}$ ) of 700nm or below.

37. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 36 wherein internal transmittance for a plate having thickness of 10mm is 75% or over at light wavelength of 1550nm.

38. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 36 having a heat resisting temperature of 800°C or over.

39. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 36 having Young's modulus of 90 GPa or over.

40. (withdrown) Low expansion transparent glass-ceramics as defined in claim 36 wherein amount of eluting lithium ion is less than  $0.0050 \mu\text{g}/\text{cm}^2$ .

41.(withdrawn) Low expansion transparent glass-ceramics as defined in claim 36 containing 3% - 6% TiO<sub>2</sub> in mass % on the basis of amount of total oxides.

42.(withdrawn) Low expansion transparent glass-ceramics as defined in claim 36 containing three or more ingredients among RO ingredients (where R is Mg, Ca, Sr, Ba or Zn) in an amount of 0.5% or over in mass % on the basis of amount of total oxides for respective ingredients.

43. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 42 containing ZnO in a larger amount than other RO ingredients in mass % on the basis of amount of total oxides.

44. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 42 containing a total amount of the RO ingredients of 3.5% or over in mass % on the basis of amount of total oxides.

45. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 36 containing a total amount of R'O ingredients (where R' is Mg, Ca, Ba or Sr) of 3% - 13% in mass % on the basis of amount of total oxides.

46. (withdrawn) Low expansion transparent glass-ceramics as defined in claim 36 comprising in mass % on the basis of amount of total oxides:

Al <sub>2</sub> O <sub>3</sub>	20 - 30%
MgO	0.5 - 2%
CaO	0.5 - 2%
SrO	0 - 10%
ZnO	0.5 - 15%
TiO <sub>2</sub>	3 - 6%
ZrO <sub>2</sub>	1 - 5%
Nb <sub>2</sub> O <sub>5</sub>	0 - 5%
La <sub>2</sub> O <sub>3</sub>	0 - 5%
Y <sub>2</sub> O <sub>3</sub>	0 - 5%
As <sub>2</sub> O <sub>3</sub> and/or Sb <sub>2</sub> O <sub>3</sub>	0 - 2%.